Information Extraction Workflow for Digitised Entry-based Documents

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1 Program

It is a 4 hours workshop:

- 30 mn: introduction of the workflow and the two tools
- 30 mn: setting up the tools on the machines
- 2 h: Two Parallel groups. Goal: Training a model for a dictionary and a model for a catalogue
- 30 mn: towards a digitisation pipeline
- 30 mn: Q&A

2 Instructors

- Mohamed Khemakhem

- Simon Gabay
- Laurent Romary

3 Target Audience

Scholars and humanists with basic notions of command lines and familiar with the TEI standard.

4 Abstract

The massive retro-digitisation of legacy paper resources in the last decade, along with the constant growth of compiled unstructured digital text material, have created an unbalanced situation where the existent *ad hoc* techniques for exploiting such resources are unable to cover the important stream of emerging corpora. In this workshop we address this issue and present an exploratory workflow implemented in two state of the art infrastructures for Information Extraction (IE) from documents with entry-based structure and diverse content.

IE in Digital Humanities (DH) has always been a serious challenge for researchers dealing with modern or legacy text resources [1, 2]. *GROBID-Dictionaries*[1] is a project which has been launched to fill in this gap by accelerating the modelling and structuring of resources within the lexicography field. The first version of the machine learning infrastructure has been focused on structuring digitised dictionaries into TEI-compliant resources [3].

In *GROBID-Dictionaries*, the activation of cascading IE models follows an exploratory process based on the MATTER workflow [4]. Throughout a multi-stage annotation and curation process, a user of the tool discovers gradually the structure and the variation of the information in a target document.

[1] https://github.com/MedKhem/grobid-dictionaries

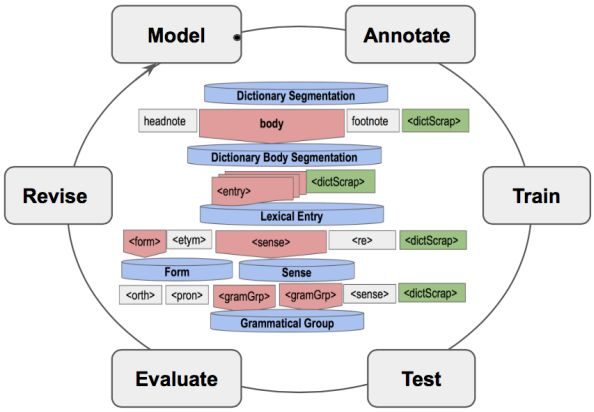
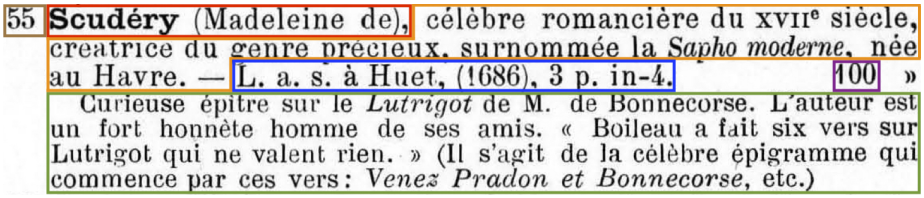


Figure 1: *GROBID-Dictionaries*'s MATTER Workflow

In addition, and despite being initially designed for structuring dictionaries, the implemented approach and the tool's pluggable models have shown enough flexibility to be applicable on a wider range of modern and legacy entry-based documents such as dictionaries [3, 5] (fig. 4), legacy address directories [6] (fig. 6), and large bibliographic collections [7].

The rising interest around the applicability of such an IE approach to certain entry-based documents [8, 9] and its fitness potential in larger document processing pipelines, triggered the creation of a second tool adapted for analysing and structuring a family of prints: *Catalogues* (fig. 5 & 7). *Grobid-Cat*[2] is a fork of *Grobid-Dictionaries* that remains faithful to the exploratory cascading approach with more optimised combination of parsing models (fig. 2) and more adapted TEI encoding (fig. 3).


55 **Scudéry** (Madeleine de), célèbre romancière du XVIIe siècle, creatrice du genre précieux, surnommée la *Sapho moderne*, née au Havre. — L. a. s. à Huet, (1686), 3 p. in-4. 100 »

Curieuse épître sur le *Lutrigot* de M. de Bonnecorse. L'auteur est un fort honnête homme de ses amis. « Boileau a fait six vers sur Lutrigot qui ne valent rien. » (Il s'agit de la célèbre épigramme qui commence par ces vers : *Venez Pradon et Bonnecorse*, etc.)

Figure 2: *RDA*, No 67 (March 1881), lot No 55.

[2]https://github.com/MedKhem/grobid-cat

```
<item n="55" xml:id="CAT_000037_e55">
   <num>55</num>
   <name type="author">Scudéry (Madeleine de),</name>
   <trait>
      <p>célèbre romancière du XVIIe siècle, créatrice du genre
      précieux, surnommée la Sapho moderne, née au Havre.</p>
   </trait>
   <desc>L.a.s. à Huet, (1686), 3 p. in-4. 100 </desc>
   <note>Curieuse épître sur le Lutrigot de M. de Bonnecorse.
   L'auteur est un fort honnête homme de ses amis.  Boileau
   a fait six vers sur Lutrigot qui ne valent rien.  (Il
   s'agit de la célèbre épigramme qui commence par ces vers:
   Venez Pradon et Bonnecorse, etc.)</note>
</item>
```

Figure 3: *RDA*, Output from Figure 1 processed with GROBID-Cat.

The proposed workshop represents an illustration of scholarly primitives practices employing a new generation of IE tools. Our goal is to familiarise interdisciplinary DH users with the MATTER workflow through two parallel hands-on sessions, each one dealing with a different category of digitised documents: dictionaries and catalogues. We rely on enhanced usability features [5] to ease the setup and the manipulation of the two systems for relaxed required IT skills. Besides presenting new powerful means for manipulating, exploring and extracting structured text from digitised material, the workshop gives DH researchers the opportunity to have an idea about the challenges of integrating such tools in digitisation pipelines. This includes providing background on the different factors interfering in the performance of machine learning models, such as information modelling, text encoding, OCR system choice and annotation consistency.

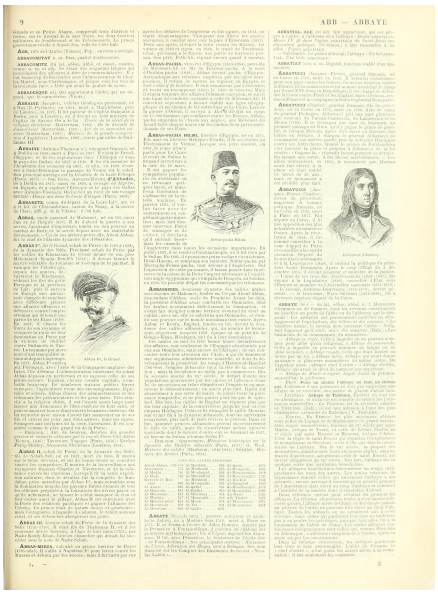


Figure 4: *Nouveau Larousse illustré: dictionnaire universel encyclopédique*, 1898, p 9

Figure 6: *Annuaire-almanach du commerce, de l'industrie, de la magistrature et de l'administration*, 1871, p. 200

Figure 5: *RDA*, No 37 (august 1873).

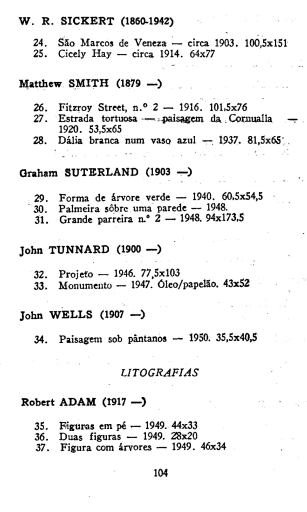


Figure 7: *I Bienal do museu de arte moderna de São Paulo*, 1951, p. 104

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